

IMPERIAL
DEPARTMENT OF AGRICULTURE
FOR THE WEST INDIES.



REPORT
ON THE WORK OF THE
GOVERNMENT LABORATORY,
AND THE OFFICE OF
THE SUPERINTENDENT OF
AGRICULTURE
FOR THE LEEWARD ISLANDS,
1914-15 and 1915-16.

BARBADOS:
ISSUED BY THE IMPERIAL COMMISSIONER OF AGRICULTURE
FOR THE WEST INDIES.

1916.

[Price Threepence.]



REPORTS

ON THE

BOTANIC STATION, ECONOMIC PLOTS, AND AGRICULTURAL EDUCATION, ANTIGUA.

Annual Reports on Certain Economic Experiments conducted in connexion with the Botanic Station, 1900-2.

Annual Reports on the Botanic Station for the years 1901 and 1902.

Annual Reports on the Botanic Station, Economic Experiments, and Agricultural Education for the years 1902-3 to 1913-14.

SUGAR-CANE EXPERIMENTS.

IN BARBADOS.

Report of the Agricultural Work for 1900 :—

Manurial Experiments and Experiments with Varieties of Sugar-cane.

Report of the Agricultural Work for the seasons 1899-1901 to 1908-10.

Parts I and II ; Manurial Experiments. Part III ; Varieties of Sugar-cane.

IN THE LEEWARD ISLANDS.

Report on Experiments conducted with Sugar-canes in the season 1899-1900.

Reports on Experiments conducted with Sugar-canes in the seasons 1900-1 to 1909-10.

Part I ; Varieties of Sugar-cane. Part II ; Manurial Experiments.

Sugar-cane Experiments in the Leeward Islands, 1911-12, 1913-14, and 1914-15.

Parts I and II published together in Royal 8vo.

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For the years 1914-15 and 1915-16.

*Government Chemist and Superintendent of Agriculture for the Leeward Islands
—to the Commissioner of Agriculture for the West Indies.*

Sir,

I have the honour to submit the following short report on the administration of the Federal Agricultural Department for the years 1914-15 and 1915-16, together with certain observations thereon.

EXPENDITURE.

1914-15.

			£	s.	d.
Personal emoluments	...	...	...	860	8 0
Other charges	...	...	...	174	8 4
Total	...	...	...	1,034	16 4

1915-16.

			£	s.	d.
Personal emoluments	...	...	...	729	9 4
Other charges	..	...	...	182	18 10
Total	...	...	...	912	8 2

STAFF.

During the year 1914-15, the constitution of the Department was remodelled in accordance with recommendations made by the Imperial Commissioner of Agriculture, and in response to representations made by unofficial members of the Federal Legislative Council that the expenditure thereon should be reduced.

The form of the alterations made in the constitution of the Department consisted in the abolition of the office of the Assistant Chemist. In the place of this officer, assistant chemists were appointed in St. Kitts and Dominica, as officers of the local Departments of Agriculture in those Presidencies; it is intended that these officers should maintain as close touch as possible with the Senior Chemist, who should exercise a general supervision over their work. It was further provided that the salary of the junior assistant in the Federal laboratory (an officer without scientific training save what he received in the laboratory) should be increased from £50 rising to £75 per annum, at which value it formerly stood, to £70 to £100 per annum.

Towards the end of the year the Clerk to the Department, Miss L. A. H. Esdaile, went on sick leave, and owing to ill health arrangements were made for her to retire on pension; consequent on this the office of Clerk was abolished and that of second junior assistant established in its place; the object sought being to obtain the services of a young man who might be useful in the laboratory as well as attending to correspondence, the increased strain involved owing to the alterations already indicated necessitating some fresh arrangement.

The writer was on leave in 1914 from May 9 to October 11. During his absence the duties of Superintendent of Agriculture were performed by Mr. F. R. Shepherd, Agricultural Superintendent, St. Kitts, and those of Government Chemist by Mr. V. M. Weil, Assistant Federal Chemist, until September 30, on which date, in accordance with the arrangement already outlined, the office of Federal Assistant Chemist was abolished and Mr. Weil left the Colony for England.

The writer would take this opportunity of referring to Mr. Weil's four years' service in the laboratory, and of placing on record his sense of appreciation of that gentleman's ability as a chemist.

At the commencement of December 1914, Mr. H. Waterland, formerly Agricultural and Science Master at the Dominica Grammar School, was appointed to the post of Chemical Assistant for St. Kitts. Prior to assuming the duties of the post in that island he spent one month at the Government laboratory in Antigua, and received a certain amount of special instruction in the methods employed in the various analytical operations in the laboratory. Prior to his appointment the Government of St. Kitts-Nevis had taken the necessary steps to have the existing laboratory building at La Guérîte adapted to the needs of regular and systematic laboratory work, and had also ordered a stock of necessary apparatus and chemicals. At the same time a certain amount of heavy and expensive apparatus, formerly the property of the laboratory which had existed in St. Kitts between the years 1891 and 1896, and which had been absorbed into the Federal laboratory stock on the inauguration of the Federal laboratory, was restored to St. Kitts. This included a Schmidt and Haensch polarimeter, a microscope, a steam oven, a Westphal balance, a rough balance, a platinum basin, and a quantity of miscellaneous glassware.

The St. Kitts laboratory was opened for regular work towards the end of January 1915.

In relation to Dominica, at the commencement of the financial year 1915-16 Mr. G. A. Jones, formerly Assistant Curator of the Dominica Botanic Station, was appointed to the post of Assistant Chemist in conjunction with that of Assistant Curator. The scheme under which he was appointed contemplated the appointment of an additional Assistant Curator, but up to the time of writing, owing to the war, it has been impossible to obtain the services of a suitable man. In consequence the scheme has not as yet attained to its full working in Dominica. Necessary apparatus has been provided by the Dominica Government, and temporary laboratory accommodation installed at the Dominica Botanic Station. During the current year it is proposed to improve and extend this.

Under the new scheme it is contemplated that in the branch laboratories in St. Kitts and Dominica it will be possible to carry out locally much of the work and many of the investigations in relation to agriculture in these two Presidencies, which formerly received attention in the central laboratory in Antigua, while any

matters which are beyond the scope of the officers and equipment of the branch laboratories will be referred to the central laboratory, which will also be responsible for the chemical work in relation to Antigua, Montserrat, and the Virgin Islands. In addition to his duties as Government Chemist, the Officer in charge of the Department is required, as Superintendent of Agriculture, to visit each of the Presidencies periodically, and to advise the local agricultural officers and Governments as and when required. After each visit a report is required to be submitted to the Commissioner of Agriculture and copies sent to the Colonial Secretary; on this the Commissioner comments and advises in due course.

Under this new arrangement the staff of the laboratory consists of the Government Chemist and Superintendent of Agriculture, and two junior assistants.

In addition, during the greater part of the year 1915, Mr. E. F. Shepherd was attached to the laboratory staff as pupil assistant.

WORK IN THE LABORATORY.

The number of samples analysed in the the Laboratory during the two years under review is shown in the accompanying tabular statements.

LIST OF SAMPLES ANALYSED. 1914-15.

Cane juices				
Sugar-cane Experiments (Antigua)	...		634	
" " " (St. Kitts)	...		351	
Cane juices (estates)	...		314	
Sugars and molasses (complete analysis)	...		3	
Sugars and molasses (commercial polariscopic tests)	...		69	
Water	...		25	
Water (mineral content)	...		2	
Kerosene	...		93	
Milk	...		4	
Condensed milk	...		1	
Manures	...		6	
Soils	...		2	
Marl (calcium carbonate content)	...		6	
Soils (complete examination)	...		2	
Rock	...		3	
Lime juice	...		8	
Lime seeds (manurial value)	...		2	
Essential oil	...		1	
Material taken in cases of suspected poisoning	...		3	
Poisoning of stock	...		1	
Leaves (manurial value)	...		2	
Bay oils	...		20	
Cottons	...		33	
Corn (moisture determination)	...		33	
Corn and cobs (feeding value)	...		2	
Corn and cobs (manurial valuation)	...		1	
Pigs' fat	...		2	
Paint	...		8	
Soap	...		1	
Metal	...		1	
Citrate of lime	...		1	
Caustic soda solution	...		1	
			1,635	

LIST OF SAMPLES ANALYSED.
1915-16.

Cane juices					
Sugar-cane Experiments (Antigua)	...	...	...	...	692
Cane juices (estates)	...	...	...	...	17
Sugars and molasses (commercial polariscopic tests)	...	...	...	...	23
Sugars (test for salt)	...	...	...	...	2
Sugars (moisture and polarization)	...	...	...	...	8
Sugar liquor	...	...	...	...	4
Molasses (ash)	...	...	...	...	2
Scum cake	...	...	...	...	3
Diatomite	...	...	...	...	1
Water	...	...	...	...	9
Kerosene	...	...	...	...	43
Milk	...	...	...	...	9
Manures	...	...	...	...	2
Soils (special tests)	...	...	...	...	26
Limes	...	...	...	...	1
Lime juice	...	...	...	...	3
Marl (calcium carbonate content)	...	...	...	...	2
Material taken in cases of suspected poisoning	...	...	...	...	12
Poisoning of stock	...	...	...	...	1
Leaves (manurial value)	...	...	...	...	1
Bay oils	...	...	...	...	17
Cottons	...	...	...	...	34
Corn	...	...	...	...	2
Corn (moisture determinations)	...	...	...	...	47
Corn meal	...	...	...	...	8
Fibre	...	...	...	...	1
Cotton fibre (oil in)	...	...	...	...	1
Breadstuffs	...	...	...	...	3
Leaves (determination of alkaloids)	...	...	...	...	3
Cattle drench	...	...	...	...	1
Disinfectants	...	...	...	...	2
Paris green	...	...	...	...	1
Wines	...	...	...	...	2
Spirits	...	...	...	...	1
Soil shrinkage investigation	...	...	...	...	27
					1,011

The number of samples examined in the laboratory were for 1914-15, 1,635, and for 1915-16, 1,011. The diminution in the number of samples handled during the year 1915-16 is in part due to the opening of the branch laboratories in St. Kitts and, to a less extent, in Dominica. In the case of St. Kitts the whole of the juices from the St. Kitts cane experiments were examined in the local laboratory, entailing a diminution of about 350 samples.

In addition the reduction in the staff of the laboratory combined with the increase in the volume of work of an administrative nature with which the Department has been called on to deal is also responsible for some diminution in the number of samples handled.

As usual, the largest number of samples handled in both years were concerned with the examination of the juices derived from the canes cultivated in the sugar-cane experiments; this work combined with the compilation of the report has again occupied a considerable share of the time and attention of the laboratory staff.

In 1914-15 the number of juices examined from estates showed a very large increase over former years, over 300 samples being examined in this connexion. This increase was due to the extension of Bendals Factory, in connexion with which institution it has been customary to perform a weekly analysis of an average sample of juice so as to furnish some check on the factory working. When the

extensions in question were made the greater complexity of the work rendered it desirable that a closer control should be established. This was secured by the analysis of samples daily in the laboratory in the first year after the extensions had been carried into effect; subsequently, on the advice of the Government Chemist, the Directorate of the factory decided to institute a simple chemical control at the factory, for which purpose a small laboratory was erected and equipped at the factory under advice from the Government Chemist, and one of the junior assistants in the Antigua Agricultural Department appointed to carry out the necessary analyses, for which purpose he underwent a special course of training in the Government laboratory.

Attention has continued to be directed to questions concerning public water-supply at different parts of the Colony; at the request of the Administrator of Dominica complete examinations and reports were made on samples of water drawn from the public water-supply of the town of Roseau, Dominica, and of the village of Soufrière in the same island. The reports were published in the *Official Gazette* of the Presidency of Dominica.

Questions in relation to the control of the milk supply of different towns in the Colony have continued to receive attention. In St. Kitts, work in this connexion has formed an important part of the operations of the branch laboratory. The control of the milk supply in St. Kitts was obtained by the operations of the Foods and Drugs Ordinance. Details in this connexion are contained in the report on the working of the St. Kitts branch laboratory for the past year.

The assistant chemist in Dominica has also conducted a short enquiry into the conditions attending the milk supply in the Presidency; the results were published in the *Official Gazette*.

As the result of the representations made by the Government Chemist, a bye-law dealing with the sale of milk in the city of St. John, Antigua, was passed by the City Commissioners in 1914, and came into operation in the following year. Under it standards of purity in relation to milk were erected and penalties for offences were prescribed, the administration of the bye-law being vested in the city authority. This bye-law has now been in force for upwards of one year, but up to the present no samples have been submitted to the Government Chemist for examination under it; this constitutes a striking contrast to the position in St. Kitts, in which Presidency upwards of eighty samples of milk were examined during 1915-16 under the Foods and Drugs Ordinance. I would again take this opportunity of expressing the opinion that the most appropriate means of securing the control of the adulteration of the milk supply lies in the passage of either a Federal Foods and Drugs Act, or of Presidential Ordinances on similar lines. Apart from questions of milk adulteration, such legislation is also very desirable for the purpose of providing adequate means of control of adulterations of other forms of food, against which, with the exception of St. Kitts, no protection exists at the present time, except in so far as it may be provided for by local regulations or bye-laws passed by the various local authorities.

Toxicological enquiries have continued to occupy a portion of the time of the central laboratory. In the year 1915-16 an unusually large number of samples was submitted in this connexion. In one case a man was found to have died from the administration of opium in some form. The existence of the central laboratory continues to form a valuable safeguard against the occurrence of crime of this description.

Samples in connexion with agricultural investigations at the various experiment stations, apart from sugar-cane work, have constituted an important item of the laboratory work. In relation to cotton, thirty-three samples were examined in 1914-15, and thirty-four in 1915-16, all of these being in connexion with breeding trials in Antigua, Barbuda, and the Virgin Islands. Throughout the cotton-growing islands of the Colony cotton-breeding trials on systematic lines are now carried out under the direction of the Agricultural Department as a regular part of routine duty; the effect of this is being increasingly shown in the improved quality of the lint produced. For the inauguration of this work a number of years

ago the laboratory was largely responsible, and it has continued to assist by performing lint examinations for those places in which on account of limitation of staff or for other reason it is not possible to complete the work of selection unassisted.

It may be added at this juncture that as the result of the Cotton Conference held in St. Kitts in March 1916, certain modifications were introduced into the methods of lint examination previously practised.

A considerable number of samples of Bay oil were examined in the laboratory mainly in connexion with the systematic trials in relation to the cultivation of the Bay tree as a crop plant, which have been in progress in Montserrat for a number of years past. The results of these investigations were summarized in a paper prepared by Mr. Robson in collaboration with the writer, and published in the *West Indian Bulletin*, Vol. XV, No. 3, in which a general summary was also given of the principal points which had been elucidated in relation to the trade in Bay oil.

A number of manurial valuations were made of organic and other manures during the year. As an adjunct to the report on the Sugar-cane Experiments for the year 1914-15, a tabular summary of the manurial composition of a large number of pen manures and other organic substances which are commonly employed for manurial purposes in these islands was prepared and published. This comprised an extension of a similar summary published in the same way in the year 1906. Such an epitome should prove of considerable value to planters in providing concise and ready information concerning this matter. It is hoped to issue the summary as a separate publication at a later date, as it possesses valuable information apart from the sugar-cane experiments.

A considerable amount of time has been devoted to the study of various soil problems. The systematic study of the conditions attending the shrinkage of soils on drying was undertaken during the year, involving the performance of a large number of measurements, the results of which it is hoped to put forward at an early date.

Considerable attention has also been devoted to the investigation of the determination of the lime requirements of soils on the lines recently put forward by Hutchinson and McClennan. A considerable number of measurements have been made, and modifications introduced into the details of manipulation. This work has been simultaneously in progress at the central laboratory and also at the branch laboratories in St. Kitts and Dominica. The application of the results attained to conditions in the field, will constitute the next step in the investigation.

Work has further been in progress with a view to the further investigation of certain of the biological factors involved in soils in the Colony, with a view to the possible erection of certain standards for fertility in this connexion in relation to the average run of soils encountered in the Leeward Islands.

Some attention has been directed to the cause of the occurrence of the so-called 'gall patches' or infertile areas in the cane growing districts of the limestone area in Antigua.

The soil survey of Antigua, which has been in progress for many years past was completed during 1914, and the results have since been published in the *West Indian Bulletin*.

An important piece of work accomplished during the year was the completion of a survey of the underground water system of Antigua, a report on this subject being prepared for publication in the *West Indian Bulletin*, Vol. XIV, No. 4. In this work analytical data were adduced in which the composition of the underground waters of various districts of the island were correlated with the geological surroundings; as a result, summarized information has been placed on record which should serve as a reliable guide in future attempts to utilize the underground water resources of the Presidency.

An investigation was carried out into the feeding and manurial value of lime seeds during the year 1915, the results being published in the *West Indian Bulletin*,

Vol. XV, No 1. The most important result of this investigation lies in the fact that it was disclosed that lime seeds contain a considerable amount of a fixed oil, which may prove to possess a commercial value.

The operations of the Government granary in Antigua caused a further addition to the chemical work of the laboratory, inasmuch as it became necessary to control the work of the drier by regular daily tests of the moisture content of the dried and undried grain. This was carried out by the Brown Duvel method devised by the United States Department of Agriculture.

This opportunity may be taken of expressing appreciation of the work of Mr. R. E. Kelsick, who has rendered much assistance in the performance of routine analytical work, especially since the abolition of the post of Federal Assistant Chemist. Mr. Kelsick entered the laboratory in 1912, and has received all the training he possesses in analytical chemistry during that period under Mr. Weil and the writer.

It may be added that during an official visit to Dominica in September 1916, a chemical investigation was undertaken by the writer in conjunction with Mr. G. A. Jones, into certain unexplained points which had transpired in work which had been in progress in Dominica with a view to controlling the losses which occurred in the manufacture of citrate of lime. As the result of this work the majority of the obscure points were satisfactorily elucidated.

The following tabular statement shows the total number of samples examined in each year from 1911-12 to 1915-16 ; in each case the sugar-cane experiment samples are given separately from the other samples examined :—

	Sugar-cane Experiment samples	898
1911-12	Other samples	372
	Total	1,270
	Sugar-cane Experiment samples	910
1912-13	Other samples	439
	Total	1,349
	Sugar-cane Experiment samples	1,027
1913-14	Other samples	660
	Total	1,687
	Sugar cane Experiments	985
1914-15	Other samples	650
	Total	1,635
	Sugar-cane Experiments	692
1915-16	Other samples	319
	Total	1,011

In concluding the review of the work of the Laboratory, it may not be out of place to add that on the occasion of a visit to England in 1914, the writer submitted himself as a candidate for the degree of Doctor of Science of London University, submitting as thesis the results of research work accomplished in connexion with soil investigation in the West Indies, and supported by the results of other published investigations in connexion with tropical agricultural chemistry. As the result of this and of the accompanying examination, the degree in question was conferred on him by the University.

WORK OF THE OFFICE OF SUPERINTENDENT OF AGRICULTURE.

At the commencement of the financial year 1914-15, a certain amount of increased definition of the functions of this office was laid down by the Imperial

Commissioner of Agriculture with the concurrence of the local Governments concerned. The lines of this are indicated in the following extract from a despatch addressed to the Colonial Secretary by the Commissioner of Agriculture and dated December 31, 1913 :—

‘ The Government Chemist and Superintendent of Agriculture..... as Superintendent of Agriculture should be required to visit the several Presidencies from time to time and to advise the local agricultural officers as may be required. His relation to the local presidential officers should be purely advisory and consultative. After a visit to any Presidency he should submit a report containing any observations and any recommendations which he may desire to offer.’

During the two years under review, the functions of the office have continued to be exercised on the above lines ; visits have been paid to all of the Presidencies in both years with the exception of the Virgin Islands, which was not visited during the year 1915-16 owing to pressure of other duties. In 1914-15, visits were paid to Montserrat and Dominica by Mr. Shepherd when acting as Superintendent of Agriculture during the writer's absence on leave.

It is to be remarked in this connexion that the reduction of the laboratory staff has had the effect of reducing the freedom of movement of the Superintendent of Agriculture owing to the greater press of duties in connexion with the work of the laboratory and office. This is to be regretted since, for the work of the branch laboratories to be fully effective, it is very desirable that they should be visited at frequent intervals by the chief chemist. It is impossible by correspondence to keep in touch with the operations of these institutions to the same extent as by frequent personal intercourse, and to afford to the full the amount of guidance and assistance to the junior chemical officers which it is desirable that they should receive.

It is to be remembered that during the two years under review, the work of the office has become very greatly increased owing to the amount of additional work of a special character which the Superintendent of Agriculture has been called on to undertake. In January 1915, instructions were issued by His Excellency the Governor, that a special visit should be paid to the small island of Redonda and a report on the phosphate deposits there existing prepared in view of the expiration of the license to the former holders. This was accordingly done and a report submitted, which was afterwards forwarded to the Secretary of State for the Colonies. The more general portions of the report were published in the *West Indian Bulletin*, Vol. XV, No. 1.

In March of the same year the Superintendent of Agriculture was called on to make a special report on the labour conditions existing in the island of Barbuda, which is worked as a Government estate ; a careful investigation of the conditions was accordingly made on the spot, and a report submitted containing certain recommendations which comprised, *inter alia*, the introduction of a system of labour registration combined with a system of bonuses to satisfactory labourers. At the same time the proposal was made for the inauguration of a system of agricultural instruction designed to improve the agricultural conditions of the people themselves. All of these proposals were subsequently approved, and in September of the same year the Superintendent of Agriculture, under instruction from the Governor, again paid a visit to the island in company with the Colonial Secretary for the purpose of inaugurating the proposed changes.

A large amount of additional work has devolved on the Superintendent of Agriculture, and on the staff of the office in connexion with the considerable efforts which have been in progress, notably in Antigua, to further the developments of subsidiary industries on co-operative lines. These have been principally concerned with the onion and corn industries. In connexion with the onion industry, the Antigua Onion Growers' Association has continued to expand ; the Association is a co-operative organization for the packing, handling, and marketing of the produce, financed and worked by planters in collaboration with the Agricultural Department. During the first three seasons the general supervision of the work has been vested

in the local and Federal officers of the Department of Agriculture in consultation with a committee of planters, while the whole of the accounts and correspondence have been dealt with in the office of the Superintendent of Agriculture.

The progress has been somewhat remarkable, and has resulted in stimulating interest in co-operative lines of development to a marked degree. The activities in Antigua have been followed by similar developments in Montserrat and the Virgin Islands. In relation to Montserrat, the Superintendent of Agriculture was able to put forward useful suggestions in regard to the formation of a similar association in that island during the course of a visit to the Presidency in June 1915, which have borne tangible fruit; while the subsequent operations of the Montserrat Association in the following season were carried out in consultation with the Superintendent of Agriculture, and in correlation with the Antigua Association. It is believed that the most satisfactory method of securing development and progress lies in the fostering of co-operative methods of working among planters, and endeavouring to correlate the work in the different islands; wherever possible this policy has been consistently held in view.

In relation to the corn industry, considerable efforts have been made to foster development, especially in Antigua. In that island, the Government in 1914 embarked on a series of large scale experiments on the kiln-drying of maize in order to test whether its keeping qualities could be improved by this process. Under instructions from the Governor, the Superintendent of Agriculture was placed in charge of these trials, the erection and equipment of the experimental plant being also carried out under his direction.

Subsequently the granary was more fully equipped for work on a commercial basis, and the purchase of corn from growers on co-operative lines inaugurated. The control of these operations was carried out entirely under the direction of the Superintendent of Agriculture, including the planning of the granary and the erection of the plant, together with the purchase of the grain, the supervision of the drying operations, and the subsequent disposal of the produce. Details concerning this are contained in the report on the working of the Antigua Agricultural Department, but mention is made of the circumstance here as in any record of the work of this office during the past two years they require to find a place.

During visits to St. Kitts and Nevis, efforts were made to interest planters in those places in the possibilities of similar development locally; a certain amount of interest was aroused in the proposals, but as the outcome of discussions with the planters and the Government further action was postponed pending the result of the Antigua trial.

In connexion with efforts to stimulate interest in the cultivation of maize in Antigua, mention may be made of the proposals made by the writer in 1915 for the holding of a show of maize and maize products. These were taken up by the Government and by the Antigua Agricultural Society, and the show was very successfully held in March 1916.

In other ways attempts have been made further to interest planters in co-operative methods, and among other efforts a scheme for the co-operative insurance of stock was prepared and was laid before the Antigua Agricultural Society, in 1915. Signs are not wanting that co-operative ideas are gaining ground as the result of the efforts made, and the fruit is being seen in the development of other co-operative projects and a general tendency towards a greater amount of concerted effort on the part of planters.

During 1915 considerable activity was evinced among planters owning or managing estates in the Windward district of the island of Antigua, with a view to formulating plans for the erection of an additional central sugar factory in connexion with those estates which do not at present contribute canes to Gunthorpes factory. A committee was formed to enquire into these questions, and on the request of the members and with the concurrence of the Commissioner of Agriculture and of the Government, the assistance of the Superintendent of Agriculture was requisitioned with a view to assisting those interested to obtain a just and accurate view of the present situation so as to ensure that in the event

of action being taken, those concerned might be completely cognisant of the various limiting factors. The results of the deliberations of the committee were summarized in a memorandum which was subsequently submitted to the Commissioner of Agriculture, who expressed the opinion that the fundamental considerations governing the case had been properly grasped and fairly estimated, while the general character of the conclusions arrived at was sound and workable. Efforts are now being made to take action on the basis of these proposals with a view to bringing the scheme to fruition.

As far as possible the Superintendent of Agriculture has continued to afford advice and assistance in relation to questions arising out of the attacks of insect and fungoid diseases. The most important of the points which have required attention and investigation in this connexion have lain in relation to the attacks of the brown hard back beetle (*Lachnosterna* sp.), which further investigation has shown to be the cause of considerable losses in relation to sugar cane and other crops in Antigua. While considerably further knowledge has resulted as to the destructive character, habits and life-history of this insect, the problem of its control is still far from being solved at the present time.

The question was reviewed in a memorandum prepared by the Superintendence of Agriculture, and considered at a meeting of planters presided over by the Commissioner of Agriculture in January 1916.

CORRESPONDENCE.

Correspondence has continued to be maintained with the Commissioner of Agriculture, the departmental officers in the various Presidencies, and with outside sources.

In connexion with the work of the branch laboratories, communication has been regularly maintained with the chemical assistant in St. Kitts with reference to the laboratory work, and to a less extent with the similar officer in Dominica; as already stated, up to the present time the amount of chemical work which has been capable of being undertaken in Dominica is limited by the fact that the Assistant Chemist is also required to perform the duties of Assistant Curator pending the appointment of a third officer as junior assistant curator.

The total number of letters received and despatched during each of the two years under review, together with the number of minute papers dealt with is shown below:—

		1914.	1915.
Letters despatched		1,039	1,303
Letters received		1,016	1,178
Minute papers dealt with		222	307
Total registered communications		2,277	2,888

In addition to the above, letters to the number of 391 were despatched in relation to the work of the Antigua Onion Growers' Association during 1915 and 1916.

Publications from agricultural institutions in various parts of the world have been regularly received and filed, and acknowledgment is here made to the various sources from which they are sent. The Department possesses a large and valuable library of literature on agricultural subjects to which additions are constantly being made.

Work in connexion with the agricultural examinations has been maintained. Preliminary and Intermediate examinations were held in both years under review, and courses of lectures delivered to students in Antigua in connexion therewith, the Superintendent of Agriculture co-operating with the local officers in the work. These examinations have largely developed into a routine part of the course accorded to young men in training under the cadet and agricultural assistant system, which has been successfully worked in connexion with the Antigua Agricultural Department for the past nine years. The passing of satisfactory examinations is now regarded as an essential feature in this training. The value of the system has now been incontestably proved, and the young men who have

passed through the course usually have no difficulty in obtaining posts on leaving the Department, while the work has also afforded a useful recruiting ground for appointments under the Agricultural Department in other islands than Antigua.

The usual meteorological service has been maintained at the laboratory, while similar services have now been inaugurated in all Presidencies except the Virgin Islands—in St. Kitts and Dominica in connexion with the work of the branch laboratories, and in Montserrat and Nevis at the Experiment Stations.

The Superintendent of Agriculture has continued to serve as Chairman of the Antigua Permanent Exhibition Committee and the Central Factories Board.

Meetings of the Agricultural Societies or meetings of planters have been attended in the majority of the Presidencies and addresses delivered on suitable subjects as opportunity offered.

During five months' absence on leave in England in 1914, the Superintendent of Agriculture attended, as the official delegate from the Colony of the Leeward Islands, the International Congress of Tropical Agriculture held at the Imperial Institute in June of that year. He presented papers to the congress reviewing the progress and history of the cotton industry in the Colony, and certain results concerned with the examination of soils in the central laboratory. He also took part in discussions on various topics connected with tropical agriculture. During the same visit he further represented the Presidencies of Antigua, St. Kitts-Nevis, and Montserrat, as Commissioner at the International Rubber, Fibres, and Tropical Products Exhibition, personally supervising the staging of the exhibits from each of these places in the combined West Indian Court, and attending the exhibition regularly for the purpose of affording information to visitors regarding the places in question.

Later he paid an official visit to Manchester, for the purpose of discussing with the officials of the British Cotton Growing Association questions in relation to the cotton industry in the Colony.

In March 1916, the Superintendent of Agriculture attended the West India Cotton Conference held in St. Kitts, as an official delegate.

In the foregoing pages the various activities of the Federal Agricultural Department during the past two years have been concisely summarized. It will be seen that concurrently with the reduction of the staff, there has arisen a further considerably increased demand on the time and energy of the Department. It is important to realize that these extensions of activity have arisen almost entirely as the result of popular or official demand in certain quarters.

The policy followed throughout has been that, wherever a request for assistance has been made to endeavour to meet it. The functions and scope of the laboratory have been defined clearly in these reports for a number of past years; increasing demands for the services of the Department, from no matter what quarter in the Colony they arise, are an irrefutable testimony to the increasing usefulness of the institution, and there would appear to be no doubt that the most effective manner of demonstrating the further possibilities of assistance involved is to render the most effective assistance in the quarters from which it is sought.

It may not be out of place in conclusion, once again to state that the staff of the institution consists of the Government Chemist and Superintendent of Agriculture, with two junior assistants, and that to deal adequately with the amount of work accomplished, which it should be added is largely of a constructive character, has made considerable demands on the energy and activity of all concerned, while there has been times when it has been difficult to keep pace with the large number of widely differing duties which the Department has been called on to fulfil.

(Sgd.) H. A. TEMPANY,

Government Chemist and Superintendent
of Agriculture
for the Leeward Islands.

Antigua,
July 22, 1916.



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